09/936682

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
US Department of Commerce
United States Patent and Trademark Office, PCT
2011 South Clark Place Room CP2/5C24
Arlington, VA 22202
United States of America

in its capacity as elected Office

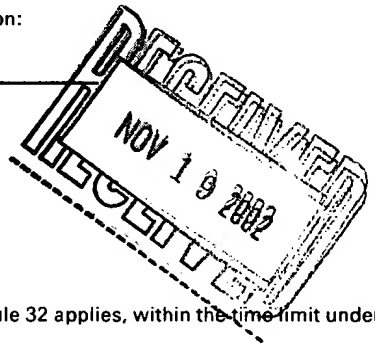
Date of mailing (day/month/year) 04 November 2002 (04.11.02)	
International application No. PCT/US00/29835	**Applicant's or agent's file reference** MGER
International filing date (day/month/year) 30 October 2000 (30.10.00)	**Priority date** (day/month/year)
Applicant CHEUNG, Yin et al	

1. The designated Office is hereby notified of its election made:

[X] in the demand filed with the International Preliminary Examining Authority on:

23 May 2002 (23.05.02)

[ ] in a notice effecting later election filed with the International Bureau on:



2. The election [X] was

[ ] was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO **34, chemin des Colombettes** **1211 Geneva 20, Switzerland**	Authorized officer Farid ABBOU
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Form PCT/IB/331 (July 1992)

US0029835

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PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference MGER	**FOR FURTHER ACTION**	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/US00/29835	International filing date *(day/month/year)* 30 OCTOBER 2000	Priority date *(day/month/year)* 30 OCTOBER 2000
International Patent Classification (IPC) or national classification and IPC IPC(7): G06T 15/00 and US Cl.: 345/419		
Applicant MAGIC EARTH, INC.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 3 sheets.

   ☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority. (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 8 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the report
   - II ☐ Priority
   - III ☐ Non-establishment of report with regard to novelty, inventive step or industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
23 MAY 2002	22 AUGUST 2002
Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer MARK K. ZIMMERMAN Telephone No. (703) 305-9798

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/US00/29835

I. Basis of the report

1. With regard to the elements of the international application:*

[X] the international application as originally filed

[X] the description:
pages 1-41 , as originally filed
pages NONE , filed with the demand
pages NONE , filed with the letter of _____

[X] the claims:
pages 42-48 , as originally filed
pages NONE , as amended (together with any statement) under Article 19
pages NONE , filed with the demand
pages NONE , filed with the letter of _____

[X] the drawings:
pages 1-17 , as originally filed
pages NONE , filed with the demand
pages NONE , filed with the letter of _____

[X] the sequence listing part of the description: NONE , as originally filed
pages NONE , filed with the demand
pages NONE , filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language _____ which is:

[ ] the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

[ ] the language of publication of the international application (under Rule 48.3(b)).

[ ] the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international

[ ] contained in the international application in printed form.

[ ] filed together with the international application in computer readable form.

[ ] furnished subsequently to this Authority in written form.

[ ] furnished subsequently to this Authority in computer readable form.

[ ] The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

[ ] The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. [X] The amendments have resulted in the cancellation of:

[X] the description, pages NONE

[X] the claims, Nos. NONE

[X] the drawings, sheets~~/fig~~ NONE

5. [ ] This report has been drawn as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

** Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).*

*** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.*

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/US00/29835

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. statement

Novelty (N)	Claims	1-41	YES
	Claims	NONE	NO
Inventive Step (IS)	Claims	1-41	YES
	Claims	NONE	NO
Industrial Applicability (IA)	Claims	1-41	YES
	Claims	NONE	NO

2. citations and explanations (Rule 70.7)

Claims 1-41 meet the criteria set out in PCT Article 33(2)-(4), because the prior art does not teach or fairly suggest:

(claims 1-11) in a three-dimensional sampling probe which is the same size or a subset of a three-dimensional data volume, extending a ribbon section from a first probe face plane toward an opposing probe face plane, one edge of said ribbon section being formed by one or more lines defined by a plurality of control points on the first probe face plane;

(claims 12-22) selectively imaging datawords representative of physical phenomena associated with a voxel at three-dimensional locations which intersect said ribbon section and said three-dimensional data volume; and

(claims 23-41) interpolating between a first spline curve and a second spline curve to define a three-dimensional surface representative of said physical phenomena.

NEW CITATIONS

NONE

INTERNATIONAL SEARCH REPORT

International application No.
PCT/[redacted]/29835

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) :G06T 15/00
US CL :345/419

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 345/419, 424; 382/131

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A, E --- Y, E	US 6,144,383 A (LICHTENBELT et al) 07 November 2000; Abstract	1-11, 19-41 --- 12-18
A --- Y	US 5,455,896 A (TAKAMURA) 03 October 1995; col.6, lines 22-40.	1-11, 19-41 --- 12-18
A --- Y	US 5,852,447 A (HOSOYA et al) 22 December 1998; col.19, line 55 to col.21, line 23	1-11, 19-41 --- 12-18

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

05 JANUARY 2001

Date of mailing of the international search report

25 JAN 2002

Name and mailing address of the ISA/US
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Authorized officer

MARK K. ZIMMERMAN

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Form PCT/ISA/210 (second sheet) (July 1998)★

AMENDED CLAIMS

[received by the International Bureau on 25 March 2002 (25.03.02);
original claims 1-41 replaced by new claims 1-43 (8 pages)]

1. A method for imaging a three-dimensional data volume, said three-dimensional data volume comprising a plurality of voxels, each voxel comprising a three-dimensional location and a dataword, said dataword being representative of a physical phenomena, said method comprising;

creating at least one three-dimensional sampling probe, wherein said three-dimensional sampling probe is the same size or a subset of said three-dimensional data volume, said three-dimensional sampling probe having a probe face in a probe face plane and an opposing probe face in an opposing probe face plane;

producing a plurality of control points in said probe face plane, said plurality of control points defining one or more lines on said probe face plane;

extending a ribbon section from said probe face plane toward said opposing probe face plane, one edge of said ribbon section being formed by said one or more lines; and

selectively imaging datawords representative of said physical phenomena at three-dimensional locations which intersect said ribbon section and said three-dimensional sampling probe.

2. The method of Claim 1, further comprising:

editing said plurality of control points in said probe face plane to thereby redefine said one or more lines, and

extending another redefined ribbon section from said probe face plane toward said opposing probe face plane.

3. The method of Claim 2, wherein said step of editing further comprises:

deleting one or more of said plurality of control points.

4. The method of Claim 2, wherein said step of editing further comprises:

changing a location of one or more of said plurality of control points.

5. The method of Claim 2, wherein said step of editing further comprises: adding one or more control points to said plurality of control points.

6. The method of Claim 1, wherein said ribbon section is perpendicular to said probe face plane.

7. The method of Claim 1, wherein said ribbon section extends from said probe face plane to said opposing probe face plane.

8. The method of Claim 1, wherein said one or more lines comprise a plurality of straight lines.

9. The method of Claim 1, wherein said one or more lines form a closed line.

10. The method of Claim 1, wherein said ribbon section is comprised of a plurality of planes.

11. The method of Claim 1, wherein said three-dimensional probe has a plurality of side faces perpendicular to said probe face plane, said ribbon section being unparallel with respect to each of said plurality of side faces.

12. A program storage device readable by a machine, embodying a program of instructions executable by machine to perform method steps for imaging a three-dimensional data volume, said three-dimensional data volume comprising a plurality of voxels, each voxel comprising a three-dimensional location and a dataword, said dataword being representative of a physical phenomena, said method comprising;

displaying a plane within said three-dimensional data volume;

producing a plurality of control points in said plane, said plurality of control points defining one or more lines on said plane;

extending a ribbon section from said plane, one edge of said ribbon section being formed by said one or more lines; and

selectively imaging said datawords representative of said physical phenomena at three-dimensional locations which intersect said ribbon section and said three-dimensional data volume.

13. The method of Claim 12, further comprising:

editing said plurality of control points in said plane to thereby redefine said one or more lines, and

extending another redefined ribbon section from said plane toward an opposing plane.

14. The method of Claim 13, wherein said step of editing further comprises:

deleting one or more of said plurality of control points.

15. The method of Claim 13, wherein said step of editing further comprises:

changing a location of one or more of said plurality of control points.

16. The method of Claim 13, wherein said step of editing further comprises:

adding one or more control points to said plurality of control points.

17. The method of Claim 12, wherein said ribbon section is perpendicular to said plane.

18. The method of Claim 12, wherein said ribbon section extends from said plane to an opposing plane.

19. The method of Claim 12, wherein said one or more lines comprise a plurality of straight lines.

20. The method of Claim 12, wherein said one or more lines form a closed line.

21. The method of Claim 12, wherein said ribbon section is comprised of a plurality of planes.

22. The method of Claim 12, wherein said plane is a probe face plane of a three-dimensional probe which has a plurality of side faces perpendicular to said probe face plane, said ribbon section being oriented so as not to be parallel to at least one of said plurality of side faces.

23. A method for imaging a three-dimensional data volume, said three-dimensional data volume comprising a plurality of voxels, each voxel comprising a three-dimensional location and a dataword, said method comprising:

positioning a face of a probe at a first position within said three-dimensional data volume;

forming a first set of control points on said face of said probe for tracking a physical phenomena described by said three-dimensional data volume, said first set of control points defining a first spline curve;

moving said face of said probe to a second position within said three-dimensional volume;

forming a second set of control points on said face of said probe for tracking said physical phenomena, said second set of control points defining a second spline curve; and

interpolating between said first spline curve and said second spline curve to define a three-dimensional surface representative of said physical phenomena.

24. The method of Claim 23, further comprising:

displaying the surface representative of said physical phenomena, said surface intersecting said first set of control points and said second set of control points.

25. The method of Claim 23, further comprising:

interpolating between said first set of control points to define said first spline curve and interpolating between said second set of control points to define said second spline curve, at least one of said first spline curve and said second spline curve being curvilinear.

26. The method of Claim 23, further comprising:

moving said face of said probe to a third position within said three-dimensional volume;

forming a third set of control points on said face of said probe for tracking said physical phenomena, said third set of control points defining a third spline curve; and

interpolating between said first spline curve, said second spline curve, and said third spline curve for enlarging said surface.

27. The method of Claim 23, further comprising:

editing at least one of said first set of control points and said second set of control points.

28. The method of Claim 23, further comprising:

forming a plurality of v-curves which interconnect between respective control points at said first position of said probe and said second position of said probe.

29. The method of Claim 28, further comprising:

displaying said spline curves and said v-curves, said spline curves and said v-curves forming a grid representative of said physical phenomena, said grid having a plurality of intersections between said spline curves and said v-curves.

30. The method of Claim 29, further comprising:

selecting one of said plurality of intersections, and moving said intersection to thereby edit said grid.

31. The method of Claim 29, further comprising:

selecting one of said plurality of intersections to thereby reposition said face to pass through said intersection.

32. The method of Claim 29, further comprising:

selecting one of said first set of control points and said second set of control points to thereby reposition said face to pass through one of said first set of control points and said second set of control points.

33. The method of Claim 23, further comprising:

forming a third set of control points on said face of said probe at said first position, said third set of control points defining a third spline curve;

forming a fourth set of control points on said face of said probe at said second position, said fourth set of control points defining a fourth spline curve; and

interpolating between said third spline curve and said fourth spline curve to define another three-dimensional surface representative of another physical phenomena described by said three-dimensional data volume, said three-dimensional surface and said another three-dimensional surface being defined substantially at the same time.

34. A program storage device readable by a machine, embodying a program of instructions executable by machine to perform method steps for imaging a three-dimensional data volume, said three-dimensional data volume comprising a plurality of voxels, each voxel comprising a three-dimensional location and a dataword, said method comprising:

positioning a plane at a plurality of plane positions within said three-dimensional data volume;

forming a set of control points at each of said plurality of plane positions such that each of said set of control points defines a related spline curve; and

interpolating between each of said spline curves to form a surface representative of a physical phenomena described by said three-dimensional data volume.

35. The method of Claim 34, further comprising:

displaying said surface representative of said physical phenomena, said surface intersecting each of said set of control points.

36. The method of Claim 34, further comprising:

interpolating between each of said set of control points to define said related spline curves, at least one of said related spline curves being curvilinear.

37. The method of Claim 34, further comprising:

editing one or more of said control points.

38. The method of Claim 34, further comprising:

forming a plurality of v-curves which interconnect between respective control points at said plurality of plane positions.

39. The method of Claim 38, further comprising:

displaying said spline curves and said v-curves to form a grid representative of said physical phenomena, said grid having a plurality of intersections between said spline curves and said v-curves.

40. The method of Claim 39, further comprising:

selecting one of said plurality of intersections, and moving said intersection to thereby edit said grid.

41. The method of Claim 39, further comprising:

selecting one of said plurality of intersections to thereby reposition said plane to pass through said intersection.

42. The method of Claim 39, further comprising:

selecting one of said sets of control points to thereby reposition said plane to pass through said one of said sets of control points.

43. The method of Claim 34, further comprising:

forming another set of control points at each of said plurality of plane positions, such that each of said another set of control points defines another related spline curve; and

interpolating between each of said another spline curves to form another surface representative of another physical phenomena described by said three-dimensional data volume, said surface and said another surface being formed substantially at the same time.